

Analysis of postoperative patient outcomes following the intervention of clinician-centered dashboards

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Introduction: The perioperative period is a data-rich environment, with potential for improving personal and population-level postoperative outcomes through digital health interventions. Data-driven performance feedback can improve professional anesthetic practice and patient-relevant outcomes [1,2]. A postoperative follow-up (POFU) registry was established at BC Children's Hospital (BCCH) to collect postoperative outcomes from ambulatory patients, which was augmented with anesthesiologist-centered dashboards to visualize performance on an individual and team level [3]. The goal of this work is to present pilot data comparing baseline and short-term implementation changes in patient-relevant outcomes.

Methods: This quality improvement project was exempt from research ethics board approval. The POFU registry contains day-surgery patient information, including age, sex, procedure (from the operating room scheduling system), post-anesthetic care unit (PACU) opioid and/or antiemetic administration (collected by PACU nurses), as well as pain, nausea, and vomiting within 24-hours post-discharge (collected from parents by a single nurse phone call). The PACU and 24-hr outcome rates are presented to the anesthesiologists using Power BI (Microsoft, Richmond, WA) run charts, and bar charts. Pre-intervention data were available for a 3/9-month baseline: April/2021 to June/2021 for PACU outcome data, and September/2020 to June/2021 for 24-hr postoperative outcome data. Post-intervention data were available for a 3-month period: September/2021 to November/2021. Baseline and post-intervention data were graphed and overall prevalence compared using Fisher's exact test. As dashboard co-design was carried out in July/2021 and August/2021, this period was plotted, but not considered for comparison to reduce bias.

Results: For the baseline period, data available for analysis included PACU data from 1,203 cases and 24-hr postoperative data from 2,966 cases (65.5% call success rate). For the post-intervention period, available data included PACU data from 1,359 cases and 24-hr postoperative data from 880 cases (64.8% successful calls). The mean baseline vs. post-intervention PACU opioid administration rates were 8.5% vs. 7.1% ($p=0.18$; Figure 1a) and PACU nausea rescue rates were 1.7% vs. 1.1% ($p=0.24$; Figure 1c). Baseline vs. post-intervention prevalence of moderate/severe outcomes in the 24-hr postoperative period were 4.4% vs. 3.2% ($p=0.15$; Figure 1d) for pain, 1.0% vs. 0.6% ($p=0.31$; Figure 1e) for nausea, and 1.1% vs. 0.7% ($p=0.34$; Figure 1f) for vomiting.

Conclusion: From the preliminary analyses, no significant differences were found for any outcome; this is possibly an effect of the low prevalence, small sample size, latency in practice change, or limitations in provider access to the data. The low incidence of PACU nausea intervention may result from total intravenous anesthesia being the predominant mode of anesthesia at BCCH [4][5]. We plan to conduct usability surveys, gather an additional 6-months of post-intervention data to enable exploration of seasonal trends in the outcome and repeat the analysis before considering any further interventions.

References: [1] Br J Anaesth. 2012 Jul;109(1):80–91. [2] Heal Serv Deliv Res. 2015 Jul;3(32):1–248. [3] Abstract accepted at the Proc Soc Tech Anesth. 2022. [4] BMC Anesthesiol. 2018 Nov 8;18(1):162. [5] Paediatr Anaesth. 2020 Aug;30(8):874–884.

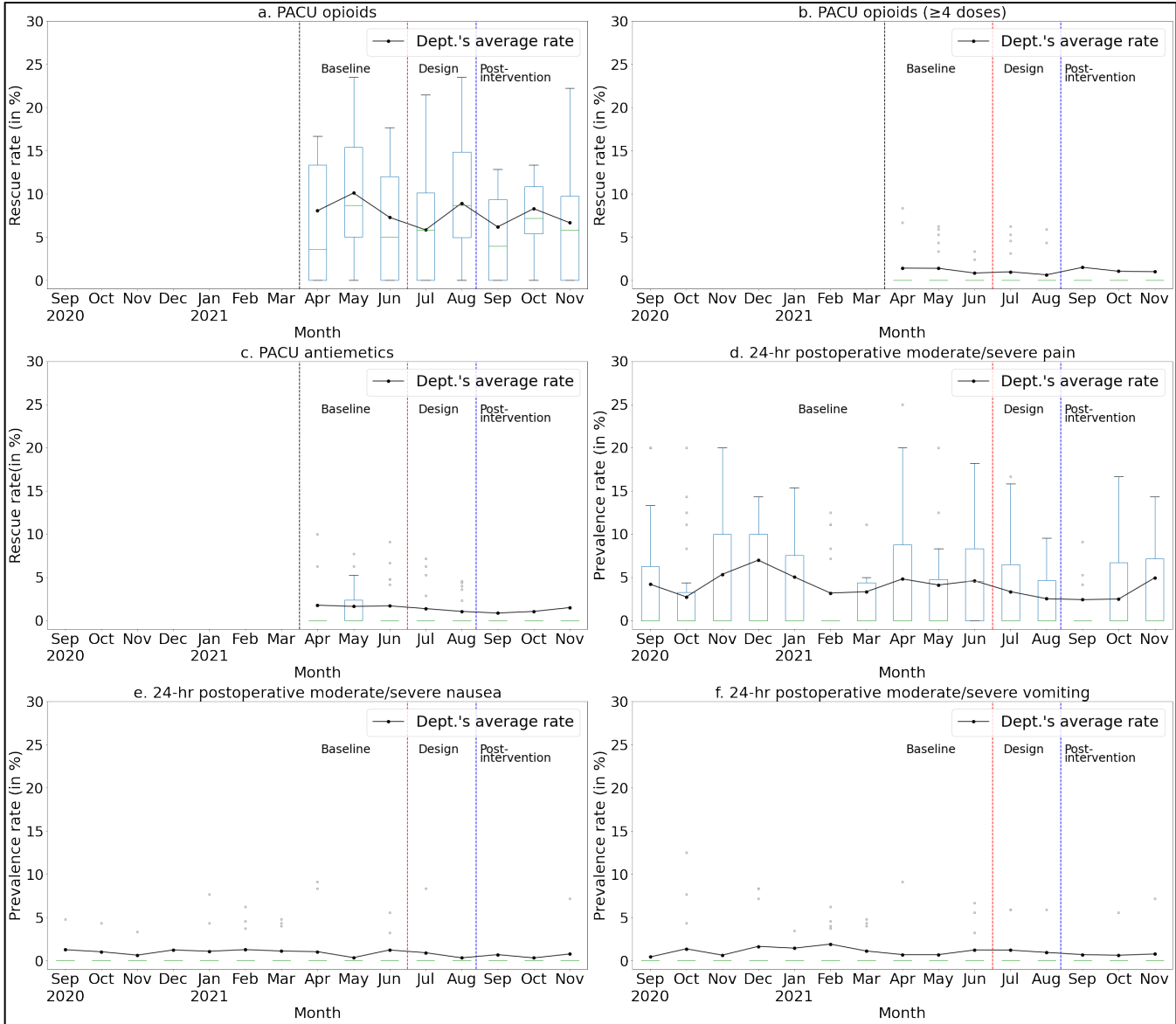


Figure 1: Variability in monthly outcome rates (in %) are plotted in subplots: for rescue rates in the post-operative care unit (PACU) including (a) opioid rescue, (b) opioid rescue needing ≥ 4 doses, and (c) antiemetic rescue; and for 24-hr postoperative outcome prevalence rates, including (d) pain, (e) nausea, and (f) vomiting. The department's aggregate outcome rates are plotted as black lines. Anesthesiologist's monthly data are superimposed as box plots; outliers < 3 times the standard deviation are plotted as gray dots; others are censored for presentation.